

Mission. Develop and demonstrate safer, higher power, more robust explosives and propellants for continued dominance in munitions and provide ordnance assessment and other direct fleet support.

Unique Features. Serves as the most diverse, one-stop, facility to develop, characterize and scale up energetic chemicals, explosives and propellant formulations, in addition to providing life cycle evaluation and incident forensic support for energetic materials. The three building complex is one of the largest laboratory complexes of its kind.



RDT&E. Primarily focused on RDT&E in energetic materials in order to improve warheads, bombs and solid rocket motors. Ongoing research is funded by the Joint Fuze Technology Program, the Joint Insensitive Munitions Technology Program, the Insensitive Munitions Advanced Development Program, The Office of Naval Research Advanced Energetics Program, the Defense Threat Reduction Agency Advanced Energetics Program, and the Strategic Environmental Research and Development Program.

Size / Description / Location / Scope of Operations. The complex includes three main buildings plus one chemical storage unit, one hazardous waste facility and two magazine facilities encompassing 39,649 SF and the facility is located in the Salt Wells area at China Lake. **Year Opened:** 2005. **Cost:** \$30M.



- **Chemical and Physical Characterization Laboratory.** Conducts basic research, quality control testing for the Pilot Plant, and does forensic investigations of energetic incidents.
- **Small Scale Formulation Laboratory.** Designed for continuous, multiple operations with explosive limits ranging from 3-70lbs net explosive weight (NEW). The facility has mix bays designed with "plug-and-play" mixers including pint scale Baker Perkins high sheer planetary mixers, melt cast kettles, slurry mixers, and state-of-the-art Resodyne sonic acoustic mixers. The facility also has explosive pressing capability and explosive drying/curing ovens. The newest capability is a direct write laboratory to study the development and printing of explosive inks.



- **Accelerated Aging Laboratory.** Equipped with small to midscale environmental conditioning chambers capable of cycling between arctic cold and desert heat to study the artificial aging for explosives, propellants, entire rocket motors, and warheads.
- **Nano-Materials Lab.** Makes use of the rapid expansion of super critical solutions and the super critical anti-solvent method and atomic layer deposition. This building has quarter pint and one pint Baker Perkins high sheer planetary mixers to formulate these materials into explosives, propellants, and pyrotechnics.
- **Nitroglycerine Lab.** Supports formulation efforts using nitroglycerine. Equipment includes high sheer planetary mixers on the 50 gram scale, 500 gram scale and 5000 gram scale. Additionally, this building hosts the thermal properties scale up lab. This lab uses a Mettler RS-1 calorimeter to assess heat flow in chemical reactions, and allows for safe scale up of explosives and novel oxidizers.

- **Research and Chemical Scale Up Lab.** Primarily focuses on new energetic ingredients. From reactive polymers, to explosive crystals, to novel oxidizers this lab supports energetic materials chemistry from the nano-gram to about 10 kilograms.

- **Pilot Plant Laboratory.** Dedicated scale up laboratory which supports work up to 100 lbs of NEW.

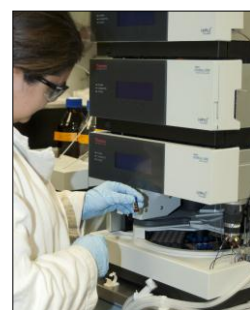
- **Improvised Explosives Lab.** Used for hazardous work involving sensitive explosives. Supports a collaborative effort with EOD to study improvised explosives being used against U.S. Warfighters in Afghanistan.

- **Thermal Decomposition Labs.** Includes external firing bays for the study of thermal decomposition of energetic materials for insensitive munitions research. This facility hosts the variable confinement and small scale bomb cookoff tests. Building is also home to the microcalorimetry lab which supports ordnance assessment work.



Equipment / Instrumentation.

- Nine control rooms commanding more than 12 Baker Perkins mixers, 1 Resodyne Mixer, 3 explosive presses, a melt kettle, two slurry kettles in addition to numerous curing/drying ovens, and several environmental conditioning chambers.
- Advanced equipment for performing wet chemical investigations, and analyzing composition, and thermal properties.
- One strand burner lab to measure solid propellant ballistics.
- Mechanical properties equipment to measure tensile properties as well as glass transitions in solid propellants.
- Scale capability includes micro-scale to multi-kilogram reactors, a Mettler RC-1 reaction calorimeter, and basic characterization.



Recognition / Awards. This laboratory and several distinguished chemists, physicists, and engineers in numerous disciplines are highly decorated in their unique fields of expertise. In addition to receiving numerous NAWCWD Warfighting awards, staff members have also received "Researcher of the Year Awards" by the OSD-Joint Insensitive Munitions Program. In addition, one senior staff member chairs an important committee for the Joint Army Navy NASA and Air Force (JANNAF) organization.



For Further Information.

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